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Confidence Interval - Applications

LATEST SUBMISSION GRADE

100%

1. Download the spreadsheet for department sales below. Use the data in the spreadsheet for the remainder of the assignment.

1 / 1 point

Course 3 Week 2 Data.xlsx

This spreadsheet lists last month's sales for a sample of 100 department stores. The sales are divided into categories of grocery sales, clothing sales, and toy sales.

Suppose we are trying to estimate the average grocery sales for all stores, of which we have data for these 100. Calculate the absolute value of $t_{\alpha/2}$ for a 95% confidence interval for grocery sales. Round to four decimal places.

1.9842

✓ Correct $=abs(T.INV(0.05/2, 100-1))$

2. Using the non-rounded value (full value given by Excel) calculated in question #1, calculate the margin of error for grocery sales. Round your answer to four decimal places.

1 / 1 point

1412.7984

✓ Correct $=1.98422 * \text{sample standard deviation} / \sqrt{n}$ We could have also calculated the margin of error using $=CONFIDENCE.T(\alpha, \text{stddev}, n)$.

3. Now calculate the margin of error for a 95% confidence interval for the population mean clothing sales and toy sales as well. Which of the three categories has the greatest margin of error?

1 / 1 point

 Grocery Sales Clothing Sales Toy Sales**✓ Correct**

CORRECT

4. Suppose we could gather more data points for clothing sales from additional stores. In order to make the margin of error for clothing sales as close as possible to the current margin of error for toy sales, how many additional data points would be required?

1 / 1 point

Assume that the mean and sample standard deviation remain the same. Round to the nearest whole number.

788

✓ CorrectTotal data points required are 888. So the **additional** data points are $888 - 100 = 788$.

You could arrive at the answer through a trial and error process whereby you try out various sample sizes till you arrive at the one that brings margin of error closest to that for toy sales. You could also use tools such as 'Goal Seek' and 'Solver' in Excel.

5. What is the 95% confidence interval for the population mean toy sales (rounding to the nearest whole number)?

1 / 1 point

 [9126, 10556] [9156, 10526] [26067, 30193] [8126, 11556]**✓ Correct**

CORRECT

6. Compared to the 95% confidence interval, is the 90% confidence interval for toy sales wider or narrower?

1 / 1 point

 Narrower; the margin of error for the 90% confidence interval is smaller, leading to a narrower range. Wider; the margin of error for the 90% confidence interval is larger, leading to a wider range.**✓ Correct**

CORRECT. Remember that there is a trade-off between precision (narrower interval) and confidence (higher confidence level).

7. What is the 90% confidence interval for the population mean toy sales. Round to the nearest whole

1 / 1 point

number.

- [9268, 10414]
- [9156, 11234]
- [10016, 12006]
- [8956, 10024]

 Correct

1 / 1 point

8. How many more store toy sales fall within the 95% confidence interval than within the 90% confidence interval?

HINT: Count the number of data points that fall within each interval separately. For counting you could either do a manual count or use the COUNTIF function in Excel. Please refer to course 1 of this specialization where we covered the usage of such functions.

3

 Correct

95% contains 18, 90% contains 15

1 / 1 point

9. Complete the following statement by filling in the blanks. More than one answer choice may be correct.

For a given standard deviation, the margin of error ____ as the sample size ____."

- increases; increases
- Increases; decreases

 Correct

CORRECT

- decrease; decreases
- decreases; increases

 Correct

CORRECT

1 / 1 point

10. Now we will work with population proportions. Enter an appropriate formula in column E that will calculate the total sales as the sum of the three categories of sales for each store.

In column F calculate the average proportion of grocery sales relative to total sales per store. That is in column F calculate columnB/columnE.

Report the average of this column (column F). This is your (\hat{p}). Round your answer to two decimal places.

0.47

 Correct

Calculate grocery sales divided by total sales for each sample store; then take the average of all grocery proportions.

1 / 1 point

11. Construct a 95% confidence interval for the population proportion of grocery sales. [Hint: use the z-statistic]

- [.2617, .6796]
- [.3728, .5685]
- [.31345, .34170]
- [.9156, .10526]

 Correct

CORRECT; Grocery proportion margin of error is .0978.

1 / 1 point

12. Suppose we could gather more data points for clothing sales from additional stores. In order to make the margin of error for the population proportion confidence interval of clothing sales equal to .07, how many additional data points would be required? Round to the highest whole number.

HINT: Use the z-statistic and remember to use a value of 0.5 for \hat{p} .

96

 Correct

196-100=96